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ABSTRACT

Sixty college subjects were administered low frequency verbal discrimination lists under the conditions of pronouncing versus button pressing as a method of choice. There were sixteen word pairs in each list, and the words were three- and four-letter low frequency words selected from the Thorndike-Lorge tables. Four random orders of the pairs were constructed for each list, those four orders being presented for Trials 1 through 4, repeated for Trials 5 through 8, etc. The lists were presented on a Stowe memory drum. Each pair was presented twice in a row at a 2:2-second rate. Ten subjects received one of the two lists, and ten other subjects received the other list within each condition. The three conditions differed only in their method of choosing the correct item during anticipation. Some of the results indicated that the mean sum of errors for the groups that pronounced their choice was lower than the mean sum of errors for the groups that pressed a button to indicate their choice or verbalized the position of their choice. Also, the groups that pronounced their choice required fewer trials to criterion. These differences were not statistically reliable. (WR)

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Technical Report No. 239

PRONOUNCING AS A METHOD OF CHOICE IN VERBAL DISCRIMINATION LEARNING

by

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Report from the
Operations and Processes of Learning
Component of Program 1

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Statement of Focus

Individually Guided Education (IGE) is a new comprehensive system of elementary education. The following components of the IGE system are in varying stages of development and implementation: a new organization for instruction and related administrative arrangements; a model of instructional programing for the individual student; and curriculum components in prereading, reading, mathematics, motivation, and environmental education. The development of other curriculum components, of a system for managing instruction by computer, and of instructional strategies is needed to complete the system. Continuing programmatic research is required to provide a sound knowledge base for the components under development and for improved second generation components. Finally, systematic implementation is essential so that the products will function properly in the IGE schools.

The Center plans and carries out the research, development, and implementation components of its IGE program in this sequence: (1) identify the needs and delimit the component problem area; (2) assess the possible constraints—financial resources and availability of staff; (3) formulate general plans and specific procedures for solving the problems; (4) secure and allocate human and material resources to carry out the plans; (5) provide for effective communication among personnel and efficient management of activities and resources; and (6) evaluate the effectiveness of each activity and its contribution to the total program and correct any difficulties through feedback mechanisms and appropriate management techniques.

A self-renewing system of elementary education is projected in each participating elementary school, i.e., one which is less dependent on external sources for direction and is more responsive to the needs of the children attending each particular school. In the IGE schools, Center-developed and other curriculum products compatible with the Center's instructional programing model will lead to higher student achievement and self-direction in learning and in conduct and also to higher morale and job satisfaction among educational personnel. Each developmental product makes its unique contribution to IGE as it is implemented in the schools. The various research components add to the knowledge of Center practitioners, developers, and theorists.

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Abstract

Sixty college Ss were administered low frequency verbal discrimination lists under the conditions of pronouncing versus button pressing as a method of choice. Contrary to a recent finding with nursery school children, no significant differences in the two response modalities were detected.

I
Introduction

In a verbal discrimination learning (VDL) experiment, S is typically presented with a pair of words, one of which has been arbitrarily chosen as the "correct" member of the pair by E. When the anticipation method of presentation is used, S is presented a word pair and he must guess which item is "correct." The S's choice is usually indicated verbaliy (i.e., S pronounces the item he has chosen). After choosing, S is provided with informative feedback in the form of the same pair of words with the E-determined "correct" item marked in some manner (e.g., by underlining it or marking it with an asterisk).

Verbalization in a VDL task has been approached primarily during the rehearsal (feedback) phase of the paradigm. For example, Carmean and Weir (1967) found that adult Ss who pronounced the correct item during feedback learned ten pairs of line drawings of common animals with fewer errors than did control Ss who were not instructed to pronounce the correct item during feedback. In terms of frequency theory (Ekstrand, Wallace, & Underwood, 1966), pronouncing the correct item during feedback increases subjective frequency (Ghatala, Levin, & Wilder, in press), thereby increasing the frequency ratio of the correct item to the incorrect item. In other words, the correct items become more discriminable due to this increase in the frequency ratio.

The present study examined the effects of pronunciation as a method of choice. Frequency theory predicts that one frequency unit is added to each item upon presentation of the pair during anticipation. This is the representational response (RR) which results in a 1:1 frequency ratio on the first anticipation trial. Pronouncing the chosen item, it is assumed, adds one frequency unit to that item. For example, if S chooses the correct item, his pronouncing response (PR) adds a frequency unit to that item, resulting in a 2:1 ratio in favor of the correct item. Finally, it is assumed that during feedback the S rehearses the correct response (RCR), adding an additional frequency unit to the correct response. Thus, if S chooses the correct item on the first anticipation trial, the resulting ratio is 3:1 in favor of the correct response. On the first trial, S has a 50 percent chance of choosing the correct item with no prior information. For the incorrect choices of the first trial, the resulting ratio is 2:2 since the PR has increased the frequency of the incorrect item. On the second trial, then, S's chances of correctly choosing an item he missed on the first trial are again 50 percent. His chances of correctly choosing an item he also chose correctly on the first trial are assumed to be greater than 50 percent.

Given that Ss actually do learn the lists as a function of pronouncing as a method of choice (PR), and assuming that pronunciation does increase the subjective frequency of the pronounced item during whichever phase that item is pronounced, the question examined in the present study was whether some other method of choice adds more or less subjective frequency to the chosen item. Due to the difficulty of correcting a previously incorrect choice, increasing the subjective frequency of the chosen item (50 percent are incorrect choices on the anticipation trial) should increase list difficulty whereas decreasing subjective frequency of the chosen item should decrease list difficulty. Frequency theory will favor a previously correct choice in either case (e.g., a correct choice on trial n will most likely lead to a correct choice for the same pair on trial $n + 1$). However, the frequency ratio after an incorrect choice is primarily dependent on the amount of subjective frequency added to the chosen item during the choice. The purpose of the present study was to vary the method of choice and assess

the effects of different methods on the number of trials to a criterion of three successive perfect trials and on the number of errors over as many trials as the fastest learner(s) required to reach criterion.

Since pronunciation has been assumed to add subjective frequency during rehearsal or feedback, it may be assumed that pronunciation is a particularly effective means of increasing subjective frequency. The present study, therefore, contrasts pronunciation with button pressing as methods of choice. A third condition was added to test the possibility that pronunciation adds nonspecific cues which become associated with the pronounced response, thereby increasing the discriminability of that response from others. In the third condition the Ss were required to verbalize the position of their chosen response (top or bottom). Position, however, was counterbalanced over trials as well as among pairs and was not an effective cue. Thus, if the effects of verbalization are specific to that which is verbalized, verbalizing the position should provide an ineffective strategy and impair performance, just as button pressing would. If, on the other hand, the effects of verbalization are nonspecific and merely provide additional auditory cues which become associated with the chosen response, verbalizing the position should not differ from pronouncing the chosen item.

II
Method

Subjects

Sixty college students participated in partial fulfillment of the requirements for an upper level Communication Arts course. The Ss were randomly assigned to six experimental groups differentiated according to three methods of choice by two lists in an anticipation trials, VDL paradigm.

Materials

Lists were identical to those of Underwood, Jesse, and Ekstrand (1964) for their first list, conditions Control (C) and Wrong (W). There were 16 word pairs in each list. The words were three- and four-letter low-frequency words selected from the Thorndike-Lorge tables (1944). The words in each list were randomly paired, and selection of the "correct" member of each pair was also random. Pairs were printed one word above the other with the correct word underlined during the feedback exposure. Four random orders of the pairs were constructed for each list, those four orders being presented for Trials 1 through 4, repeated for Trials 5 through 8, etc. The position of the correct item within a given pair was balanced across the four orders (appearing twice on top and twice on the bottom), but top and bottom position of all correct words within a given order were not equal. The lists were presented on a Stowe memory drum. Each pair was presented twice in a row at a 2:2-second rate. During the first exposure of each pair, S was instructed to indicate his choice by the appropriate method. Immediately thereafter the same pair was again presented with the two words of the pair occupying the same position but with the correct word underlined.

Procedures

Ten Ss received one of the two lists, and ten other Ss received the other list within each condition. The three experimental conditions differed only in their method of choosing the "correct" item during anticipation. Ss in Group P were instructed to pronounce their choice. Ss in Group B were provided a pair of buttons, one above the other at the side of the memory drum, and were instructed to press the button in the position corresponding to the position of the word they had chosen as the correct word. Those in Group V were told to verbalize "top" or "bottom" in choosing the correct item for each pair.

Ss were instructed to respond to each pair (including the first "guessing" trial), and were informed that learning would continue to a criterion of three successive errorless trials.

III
Results

All Ss required at least six trials to reach criterion. Table 1 represents the mean sum of errors over six trials for each list within each method of choice. As Table 1 indicates, the mean sum of errors (collapsed over lists) for the groups that pronounced their choice was lower than the means for the groups that pressed a button to indicate their choice or verbalized the position of their choice. These differences were not statistically reliable, however (F's for the main effects of Lists and Method of Choice were both less than 1; for the interaction, $F = 2.05$, $df = 2/54$, $p > .10$).

Table 2 represents the mean trials to criterion for each list within each group (trials to criterion was scored as the trial of last error before reaching the criterion of three successive errorless trials). Again, the means within each list (and collapsed over lists) indicate that the groups that pronounced their choice required fewer trials to criterion. These differences also were not reliable (F for Lists = 3.33, $df = 1/54$, $p < .10$; Method of Choice, $F = 1.25$, $df = 2/54$, $p > .10$; and their interaction, $F < 1$).

Table 1
Mean Errors Over Six Trials

	Pronounce	Button-press	Vocalize Position	Mean
List A	20.8	22.1	26.0	23.0
List B	22.3	25.3	20.3	22.6
	21.6	23.7	23.2	22.8

Table 2
Mean Trials to Criterion of Three Successive Perfect Trials
(scored at trial of last error)

	Pronounce	Button-press	Vocalize Position	Mean
List A	7.4	8.5	8.8	8.2
List B	6.3	7.1	7.5	7.0
	6.9	7.8	8.2	7.6

IV
Discussion

Although pronunciation as a method of choice appears to improve performance slightly, there were no reliable differences between methods of choice. The advantages of pronunciation as a method of rehearsal (Carmean & Weir, 1967), it must be remembered, are in contrast to silent rehearsal. The ideal test situation for the corresponding effects of pronunciation as a method of choice would contrast pronunciation with a silent condition. However, some type of overt response to the S's choice is required for scoring purposes, and it may be the case that differences among types of overt responses are minimal.

In light of some more recent evidence from Wilder and Levin (in press), it is interesting to note that pronunciation as a method of choice, while not reaching the criterion for statistical significance, tended to improve performance in college Ss in the present experiment. Wilder and Levin found that pronunciation as a method of choice facilitated learning in nursery school children with picture pairs, whereas for fifth-grade children and adults there was no method of choice main effect with either picture or word pairs. There was an interaction of method of choice with trials for word pairs in fifth-grade Ss, however, which indicated that pronunciation as a method of choice improved performance over trials more than pointing as a method of choice (all data were error scores over only two trials). It is possible that there is a developmental trend during which pronunciation as a method of choice aids performance at early ages but becomes increasingly less facilitative with increasing age until, at adulthood, there is no facilitation.

Perhaps the lack of difference between response modalities is caused by covert verbalization in older Ss, regardless of the required method of choice, which does not occur in nursery school Ss. There are at least two ways in which pronunciation (overt or covert) might facilitate performance in spite of the rationale presented here. First, the facilitative effects of pronunciation when the item is chosen covertly might outweigh the inhibitory effects predicted when the incorrect item is chosen. Second, frequency theory ignores the possible effects of the S's knowledge of the correctness of his choice. If this knowledge is a contributing factor, then any variable which increases S's memory for the item which was chosen should facilitate performance.

Suppose that information about the correctness of S's choice on a given trial is stored in memory and may be retrieved on the next trial. If S can then remember which item he chose on the previous trial, the combination of these two pieces of information will invariably lead him to the correct choice. In other words, if S chooses the wrong item on trial n, and then on trial $n + 1$ remembers which item he chose on trial n and remembers that it was wrong, he can make the correct choice. Pronunciation as a method of choice may be assumed to increase the probability that S will remember which item he chose and, therefore, facilitate performance. An explanation of the developmental trend, then, may lie in the possibility that adult Ss automatically verbalize their choices in a covert fashion regardless of the required method of choice.

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